Nutrition News

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NUTRITIVE REQUIREMENTS OF CHILDHOOD

By P. C. JEANS, M. D.
The State University of Iowa

The calcium requirement is one of the most important problems in child feeding. In infancy the calcium intake need not be considered to any great extent because the baby's calcium requirement is being taken care of by the mother's milk or a modified cow's milk formula. It is beyond infancy, then, that the question arises as to what the need is for calcium and therefore what the need is for milk, since we can consider these two things more or less synonymous.

We have studied this question of calcium requirement over a period of nearly ten years. The age groups studied have been all the way from birth up to twelve years. We estimate the need by calculating the amount of calcium that must be added to the body each day in order to maintain growth.

We have found that between one and three years of age and between ten and twelve years (and probably throughout adolescence, although more research is needed for this period) a quart of milk a day is required to maintain the calcium retention at a point that we think is suitable for good bone growth, whereas from four to six years of age, the time of slowest growth throughout the period of childhood, the requirement is not very far from a pint a day. It is for this age period that other workers have recently published the milk requirement of children. Their findings agree with ours. However it should be emphasized that a pint is not enough except during one brief period which we can ignore, for practical purposes, because it is so brief. From seven to nine years, growth is a little faster and a pint and a half of milk daily will answer the need at this time.

That covers the period from birth up to twelve years. With a quart needed at two of those periods and a pint and a half at another one, a quart daily would seem a safe general recommendation for the period of childhood.

Some pediatrists maintain that a quart of milk a day will decrease the child's appetite for other foods. This question of appetite

Doctor Jeans

is perhaps built on a wrong premise. If a child is malnourished because he has a poor appetite, it is very natural for him to select wet foods first when he is placed at the table. If a glass of milk is there, he is likely to drink it, and is also likely not to eat other foods. Such a child needs not less milk in his diet but re-training in feeding habits.

The human requirement for vitamin A is not accurately known. Some reports have placed the requirement as low as 1200 to 1500 U. S. P. or International units a day, others at 3000 units or more. Milk is an excellent contributor of vitamin A to our diet. When the requirement gets in the neighborhood of 2000 units we are getting into the field of what a quart of milk may supply. As to vitamin B, it appears from indirect evidence that infants during the first year receive adequate amounts of vitamin B from milk until they receive supplemental foods.

We have found that vitamin D milk containing 135 U.S.P. units to the quart prevents rickets and produces an average rate of growth. Babies fed milk containing 400

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Food MAKES A DIFFERENCE

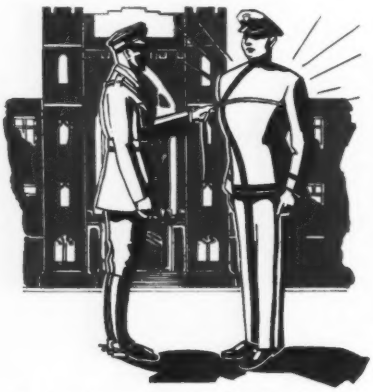
A TRUE STORY

West Point is, in effect, a health demonstration on a huge scale. There are few opportunities to see so convincingly the way in which an excellent health regime, including an optimum diet, contributes to superb physical development.

The very mention of "West Point" makes one unconsciously straighten up, for the West Point cadets epitomize our ideal of physical fitness, vigor and endurance. While considerable glamor is connected with life at West Point, relatively little is known of just what it is that produces these fine specimens of manhood.

A "close-up" of life at West Point convinces anyone that the results of the four-year training are not accidental. Every incident of the day contributes to improving the better-than-average physical status of the cadets. The boys must be in fine condition when they enter the Academy, or they are rejected. The high standards at West Point demand that cadets constantly improve throughout the four years.

It is surprising to see how much is accomplished in one year at West Point. The average member of a representative class of plebes (as the new cadets are called) increased his height by .4 inches and his weight by 10.1 pounds. The class increased its collective chest measurement 137.5 inches, and its aggregate weight 2.78 tons.



Cadets increase their collective chest measurement 137.5 inches the first year.

The system of physical education at West Point is unique, and is in part responsible for the fine development of the boys. Instead of producing a few athletes of exceptional skill in some one sport, the system makes every cadet an athlete of diversified accomplishments. A record is kept of the physical capacities of every cadet during the entire four years of his course. If he shows any deficiencies, he is given corrective exercises. By this means the cadet attains a well-rounded development.

Every Cadet A Quart of Milk

An indispensable part of the cadet's health regime is his controlled and adequate diet, containing liberal amounts of dairy products and the other protective foods. Every cadet receives a quart of milk a day; ice cream is served twice a week, or oftener if there is a holiday or special meal. An average of one-sixth pound of butter is consumed daily by each cadet. The other protective foods—vegetables, fruits and eggs—are used in liberal amounts. Each day the 1800 cadets consume 3600 eggs, 450 pounds of ham, 1800 quarts of milk, 160 quarts of cream, 260 pounds of the highest grade of butter and 800 loaves of bread.

Mealtime has its own special rites and ceremonies presided over by upper classmen. At the foot of each table sit three or four plebes; they are balanced gingerly on three inches of their chairs, and must not speak unless questioned. Their task is to pour the milk and water, and do the carving and serving. Only on two occasions during the year is their position reversed and they are permitted to turn the tables on the upper classmen.

The healthy, erect, symmetrically developed young men who graduate from West Point are the result of a four-year regime which is designed to make them perfect physical specimens. Excellent diet, along with a well-balanced program of exercise, rest, study and play make up this important regime.

glamor

The nutrition research studies, reported below, suggest only a few of the ways in which findings of such research can be applied in improving human health.

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Studies with groups of children receiving varying amounts of vitamin B show that when vitamin B intake is increased, food consumption is definitely increased. Both wheat germ and the crystalline vitamin had this effect on appetite. Increased milk consumption was especially noted.

Intermittency in growth has been suggested as a means for selecting children who need health improvement. Children are weighed each month, and are singled out for special attention if there is no gain or a loss for each of three successive months. Intermittency in growth is found to be nonidentical with poor growth for the school year, and is usually indicative of poor health habits, recent illness or serious physical defects.

It is difficult to estimate the vitamin B_1 content of a diet because of loss in cooking and other reasons. By assaying composite samples of the food of nursery school children, it was found that an adequate intake of vitamin B_1 is assured if at least 40% of the total number of calories is derived from milk, 18 to 20% from cereals (at least one-half from whole grain products) and 16 to 22% from fruits and vegetables. Milk was found to contain more vitamin B_1 than the estimated content, the average being about 25 Sherman-Chase units per 100 grams.

Vitamins and hormones have been discovered and identified only during the present century. Recent work indicates some similarities between the chemical structure of vitamins and that of hormones. Vitamin D might be called a hormone, since the substance in the skin which is activated by ultraviolet light is secreted by the sebaceous glands. Other evidences of relationship between vitamins and hormones indicate the danger in the current craze for vitamin concentrates and hormone preparations.

A SCIENTIFIC STUDY

By Miss Ruth Blair
Department of Home Economics
The University of Chicago

Dietary standards must be tested in practical situations in terms of everyday foods before they are generally accepted. One method of doing this is to determine by large-scale feeding the effect on growth and physical status of children of adding certain basic foods to the diet. Such experiments show whether or not it really makes a difference if a child receives a fully adequate diet or one giving only bare maintenance.

As part of a larger study, we attempted to determine whether the addition of a pint of milk daily to the diets of children already receiving approximately one pint would produce any measurable improvement in growth in height and weight, and whether any advantage could be demonstrated for vitamin D milk. The study was carried out over a period of one year, in an institution housing approximately 150 children, the majority of whom were of grade school age. The children were divided into three matched groups: one group was left on the institutional diet, one was given an additional pint of plain milk, and one, a pint of vitamin D milk.

The milk was given to the nursery school children at 10 in the morning; to the school children it was given as part of the noon lunch. Large glasses were used, and the entire pint of milk, as cocoa, was given in one serving.

Results Measured

The children's physical status was assessed in several ways at the beginning and end of the experiment and during the year. Height and weight were measured monthly.

At the end of the year, the total and mean gains for the three dietary groups were compared. Mean gains in height and weight were greater for both the milk groups than for the control, with little difference between the groups given the two types of milk. The mean gain in height of the control group was 5.3 cm. as compared with 6.2 cm. for both the milk group and the vitamin D milk group; the mean gain in weight was 3.33 kg. for the control group, 4.36 kg. for the milk group and 3.95 kg. for the vitamin D milk group. These differences are not large, but they are consistently in the same direction.

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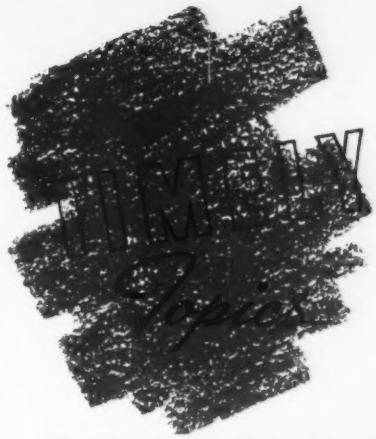

New Names—The vitamin formerly known as G or B_2 now has the official name of riboflavin. This term was agreed upon at the Fifth Annual Meeting of the American Institute of Nutrition (Baltimore, March 30, 1938). The committee on vitamin nomenclature, composed of Drs. E. M. Nelson, E. V. McCollum and H. C. Sherman, has agreed upon a plan for choosing a name for vitamin A, and reports that the Council on Foods and the Council on Pharmacy of the American Medical Association have expressed willingness to give up the use of "cevitamic acid" and accepted the use of "ascorbic acid" for designating vitamin C.

Largest Milk Shed—The food commission of New York has just announced that it gets its milk from an area comprising 7 states and within a radius of 500 miles of New York City. In this milk shed, as it is called, there are 62,286 establishments outside of the city, and 475 within the city and the metropolitan area, which furnish the milk supply for New York City's population of 7,294,000 and 1,000,000 commuters and daily visitors.

Food Requirements—A daily intake of from 2,000 to 4,000 units of vitamin A for an adult is recommended by the Technical Commission for the Study of Nutrition of the League of Nations. This amount is supplied by one pint of milk, one egg, 25 grams of butter and a medium serving of a green leafy vegetable. The Commission further recommends that all children between 2 and 14 years be given one quart of milk daily, in addition to an egg, green leafy vegetables, butter and cod liver oil. This would furnish at least 6,000 to 8,000 units of vitamin A.

A PRACTICAL PLAN

By Miss Pearl MacDonald
State Extension Nutritionist
University of Delaware

A breakfast improvement project was carried on in 1936-37 as a part of a program of public health education in Kent County, Delaware. The Delaware State Board of Health cooperated in the program with the State Board of Education and the State Extension Service, University of Delaware.

The program included a preliminary series of nutrition lessons for public health nurses; circular letters to parents, containing nutrition information and pattern meals at low cost; letters to physicians asking their cooperation in the endeavor; meetings with parents, with teachers, with local club groups, and with Home Demonstration Clubs. A special leader-training meeting on Better Breakfasts for Children was held for Home Demonstration Clubs, and the members in turn gave demonstrations of good breakfasts to mothers' clubs.

Better breakfasts were chosen as the objective of the program because of the importance to the child of a good breakfast, and because it is believed to be the least satisfactory meal, from the nutrition standpoint, among rural people. A preliminary study of present breakfast habits was made in order to provide us with definite facts in discussing the nutrition program with parents. The study was conducted as follows: as the dental hygienist worked with each child individually, from the first through the twelfth grade, she asked him what he had had for breakfast that morning and noted same. Reports on 6511 breakfasts were obtained in this way.

Poor Food Habits Revealed

The results of this study showed that about half the breakfasts were inadequate, either in quality or in kinds of food necessary for good nutrition. 63% contained no milk apart from that used on the cereal, 82% contained no fruit, 46% no cereal, and 2% of the children had no breakfast at all. The need for improvement was obvious and we set about to remedy this situation by defining a good breakfast as one which contains:

Fruit—fresh, canned, or dried
Bread or toast with butter
Cereal with milk
Milk to drink
Egg or other protein, if possible.

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—that 1,135,000,000 quarts of milk are used each year for ice cream? This is 2.3% of the nation's total milk supply.

—that a soilless farm on Wake Island in the Pacific has already produced four successful crops? Water containing essential minerals takes the place of soil on this farm, designed to provide fresh vegetables for Pacific Clipper passengers and crew.

—that milk is the most popular beverage of Princeton University seniors, according to results of the annual senior class poll? The average daily milk consumption of a Princeton student is almost a quart.

—that yarn is now being manufactured from that versatile plant, the soy bean? Intensive research is being done on soy bean products in nearly every country of the world.

—that the Vanishing American is now a myth, due to improved living conditions? The birth rate of the Indians is the highest of any population group in the country.

—that in a recent survey of two large milk plants, the average life of a quart milk bottle was found to be 19 trips, as compared to only 8 trips for the pint bottles?

—that in 27 large American cities there were no deaths from typhoid fever during 1937? Only 18 cities claimed this record in 1936.

—that the breakfast of the Syrian people always includes two kinds of cheese? Large amounts of sweet butter and clabbered milk are also used.

THINGS YOU'LL LIKE TO READ

THE HUMAN REQUIREMENT OF VITAMIN D—by P. C. Jeans and Genevieve Stearns. Journal of the American Medical Association 111:703 (August 20) 1938.

This article summarizes our present knowledge on the vitamin D requirement during infancy, childhood, adolescence, adulthood, pregnancy and lactation. Much of it is based on the authors' own research.

HOME AND SCHOOL COOPERATION FOR THE HEALTH OF SCHOOL CHILDREN—A Report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association with the Cooperation of the National Congress of Parents and Teachers. 1937.

This bulletin discusses factors which influence child health and tells how the home and school can cooperate in working for better health for all the children.

A PRACTICAL PLAN

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There has been general public amazement at the results of the breakfast study. We do not expect sweeping improvements in food habits, but we have been gratified by the interest and cooperation of all of the various organizations in the State which reach our rural people. One of our purposes is to foster this attitude and cement the health efforts of these groups for the great benefit of our people.

A SCIENTIFIC STUDY

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When the actual gains are compared with the expected gains for the period, the superiority of the gains of the milk groups is even more evident. While the control group made but 106% of its expected gain in height, the milk and vitamin D milk groups made 117% and 115% respectively. For weight the gains were 109%, 122% and 118% of the expected gain for the three groups, in the same order.

The fact that greater gains were not made by the milk groups may probably be attributed to the fact that the diet was still low in some of the dietary essentials not supplied by milk.

Note—A mimeographed sheet containing references to all major items mentioned in NUTRITION NEWS may be obtained on request from the National Dairy Council, Chicago, Illinois.

MILK—FROM DAIRY TO DINNER TABLE—by Robert E. Neprud. Hygeia Magazine, July 1938, page 609.

The care of milk in the home is discussed in this brief article. "Keep milk cold, clean and covered" are the three C's which serve as guideposts to the proper care of milk, says the author.

WHO GETS YOUR FOOD DOLLAR—by Hector Lazo and M. H. Bletz. New York: Harper Bros., 1938. $1.25

This book presents in popular style facts about the costs, margins, profits and wastes in the production, processing and distribution of foods. Unfortunately its general usefulness is lessened because the sample diet introduced does not conform to generally accepted food standards set by the Bureau of Home Economics, for the same cost level.

NUTRITIVE REQUIREMENTS OF CHILDHOOD

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units to the quart, retain greater amounts of calcium and phosphorus in their bodies and their growth is more rapid than the average. When fed vitamin D in amounts of 1,000 units or more, the babies generally do not grow any faster than the average.

Modification of milk for infant feeding offers special problems. All of the modifications that are employed in making milk more suitable for infant feeding are in the one direction of making a softer, finer curd in the infant's stomach. There are a number of ways in which this is done. One of them is by boiling the milk. In addition to this, there are at least two other ways that are commonly employed: dilution and acidification. With the dilution method, of course, the infant receives less milk because of the addition of the diluent. With acidification, the infant can be fed a larger amount of milk than ordinarily can be done with dilution, with the result that the babies grow at a more rapid rate.

We're Sorry—Dr. Nina Simmonds is Lecturer in Nutrition at the College of Dentistry, University of California, located at San Francisco. In the April number of NUTRITION NEWS to which Dr. Simmonds contributed a valuable article, we made the mistake of giving her location as Berkeley.